



Australian Government

Department of Education, Employment and Workplace Relations

RIIPSM308A Monitor and maintain furnace gas efficiency

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the monitoring and maintenance of furnace gas efficiency in the metalliferous mining industry. It includes preparing for plant and equipment operation, maintaining efficient operation of furnace gas plant and systems, controlling furnace gas emissions, maintaining efficient operation of furnace air injecting equipment, ensuring supply of additives, maintaining plant and equipment efficiency, and shutting down plant and equipment. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</p>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for plant and equipment operation	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Receive, interpret and clarify shift changeover details 1.3. Establish and maintain communication with other personnel using approved communication methods 1.4. Select personal protective equipment appropriate for work activities 1.5. Select appropriate auxiliary equipment for work activities 1.6. Carry out equipment pre-start checks to ensure equipment is ready for operation 1.7. Identify, address and report potential risks and hazards 1.8. Identify, address and report environmental issues 1.9. Follow emergency procedures to ensure safety of personnel and plant 1.10. Use approved dust suppression and extraction methods 1.11. Ventilate work area before entry
2. Maintain efficient operation of furnace gas plant and systems	2.1. Carry out plant and equipment start-up checks and procedures according to plant/equipment configurations and system requirements 2.2. Carry out monitoring and control on DCS 2.3. Operate and maintain air operated breathing equipment for furnace off-line entry
3. Control furnace gas emissions	3.1. Carry out plant and equipment start-up checks and procedures according to plant/equipment configurations and system requirements 3.2. Monitor and operate accretion build-up removal equipment to ensure efficient operation of air injection equipment 3.3. Monitor furnace feed chutes for blockages and maintain to ensure optimum production 3.4. Take samples of molten metal to confirm

	molten metal quantity and condition of molten metal bath
4. Maintain efficient operation of furnace air injection equipment	<p>4.1. Carry out plant and equipment start-up checks and procedures according to plant/equipment configuration and system requirements</p> <p>4.2. Monitor furnace conditions and operations to identify the correct, efficient operation of the furnace air injection equipment, and report to Control Room Operator</p> <p>4.3. Identify furnace inefficiencies and furnace air injection equipment and change/replace where necessary, ensuring minimum furnace down-time</p> <p>4.4. Clean furnace air injection equipment/device without causing damage</p> <p>4.5. Check and record furnace air injection equipment/device position, and recalibrates where outside operating parameters</p>
5. Ensure supply of additives	<p>5.1. Monitor and maintain condition of furnace feed materials</p> <p>5.2. Monitor furnace additives supply and report to Control Room Operator for action</p>
6. Maintain plant and equipment efficiency	<p>6.1. Clean plant to maintain condition of all equipment to ensure safe and efficient operations</p> <p>6.2. Identify and report hazards to maintain a safe working environment</p> <p>6.3. Interpret and respond to plant alarms, take remedial actions and notify appropriate personnel</p> <p>6.4. Check and adjust plant condition to maintain efficient operation</p> <p>6.5. Install and control stand-by furnace burner equipment to maintain safe furnace refractory temperatures</p> <p>6.6. Inspect air, gas, diesel and combustion supply equipment and replace/report faults, damaged or inoperable equipment to appropriate personnel</p> <p>6.7. Carry out minor plant maintenance and lubrication tasks</p> <p>6.8. Provide support for maintenance personnel where necessary to organisation's</p>

	requirements
7. Shutdown plant and equipment	<ul style="list-style-type: none">7.1. Shutdown or isolate plant/equipment based on process and safety requirements7.2. Perform post shutdown or isolation checks7.3. Pass on shift changeover details to oncoming shift

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to monitor and maintain furnace gas efficiency:

- apply legislative, organisation and site requirements and procedures for monitoring and maintaining furnace gas efficiency
- troubleshoot
- apply precautions necessary for safe working
- use protective clothing and equipment
- apply operating procedures
- report faults
- recognise limits of authority
- apply team working practices
- communicate information
- use hand and power tools

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to monitor and maintain furnace gas efficiency:

- principles of furnace operation/ furnace components
- gas paths
- insulation (refractory)
- combustion principles
- importance of flame patterns/flame impingement
- methods of resolving combustion/gas problems
- ability to isolate problem to item of equipment

Evidence Guide

<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p>Overview of assessment</p>	
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:</p> <ul style="list-style-type: none"> • knowledge of the requirements, procedures and instructions for monitor and maintain furnace gas efficiency • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of monitor and maintain furnace gas efficiency • working with others to undertake and complete the monitoring and maintenance of furnace gas efficiency in a way that meets all of the required outcomes • consistent timely completion of monitoring and maintenance of furnace gas efficiency that safely, effectively and efficiently meets the required outcomes
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of

	<p>assessment should not be greater than those required on the job.</p> <ul style="list-style-type: none"> • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	<p>This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:</p> <ul style="list-style-type: none"> • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • working with others to undertake and complete the monitoring and maintenance of furnace gas efficiency
Guidance information for assessment	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

Range Statement

<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
<p>Relevant compliance documentation may include:</p>	<ul style="list-style-type: none"> • legislative, organisational and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
<p>Legislation may include Acts and regulations dealing with:</p>	<ul style="list-style-type: none"> • mining safety and health • mine inspection • OHS • explosives • environment
<p>Auxiliary equipment may be anything that is portable and mobile that is not part of the fixed infrastructure, and may include:</p>	<ul style="list-style-type: none"> • weighers • compressors • distribution control systems • feeders • gantry cranes and attachments and other mobile equipment • hand and power tools • hoses (water and air) • pumps
<p>Pre-start checks may include:</p>	<ul style="list-style-type: none"> • availability of equipment • detection of conditions that are unusual • job requirements • personnel availability • walk through plant • communications
<p>Environmental issues may include:</p>	<ul style="list-style-type: none"> • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise

	<ul style="list-style-type: none"> • recycling • run-off • spills • waste management and disposal • water quality
Start-up checks may include:	<ul style="list-style-type: none"> • draft systems • cameras and monitors • checking distribution control system (DCS) • chutes • display instruments, lights and gauges • equipment stop engine lights • hydraulic system • isolations • lighting • suppression systems/valves • visual and audio warning devices and lights
Monitoring may include:	<ul style="list-style-type: none"> • blockages and spillages • feed rates • overloads • pressures • power draw • wear and tear • emissions • levels • temperatures • moisture content • on-stream analysis (OSA) • filtering • corrosion • indicators including" • alarms • distribution control systems • mimic panel • screens • temperature • flow • weight • pressure
Furnaces may be:	<ul style="list-style-type: none"> • fixed - vertical/cylindrical • rotary - vertical/cylindrical
Equipment and plant cleaning	<ul style="list-style-type: none"> • degreasing

methods may include:	<ul style="list-style-type: none"> • forced air • sweeping
Plant condition may include:	<ul style="list-style-type: none"> • air ingress to furnace • fuel flow too low or too high, surging • discharge of flue dust • molten metal splashes • moisture levels incorrect
Burners may be:	<ul style="list-style-type: none"> • diesel • natural gas
Minor plant maintenance may include:	<ul style="list-style-type: none"> • lubrication • minor adjustments to operational plant • cleaning plant, equipment and work area • installation/removal of devices to allow safe maintenance • fixing leaks

Unit Sector(s)

Smelting

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.